Topic: **Probability And Constructions**

Chapter Flowchart

The Chapter Flowcharts give you the gist of the chapter flow in a single glance.

Probability

Probability is a quantitative measure of certainty.

Random Experiment: Any activity which is associated to certain outcome is called random experiment, e.g., (i) tossing a coin (ii) throwing a die.

Elementary Events : An outcome of a random experiment is called an elementary event.

Compound Event : An event associated to a random experiment is a compound event, it is obtained by combining two or more elementary events associated to the random experiment.

Sure Events : Those events whose probability is one.

Impossible Events : Those events whose probability is zero.

Negation of an Event: Corresponding to every event A associated with a random experiment, we define an event "not A" or $\overline{A}$ which occurs when and only when A does not occur. For any event A,

$P(A) + P(\overline{A}) = 1$

$\Rightarrow P(\overline{A}) = 1 - P(A)$.

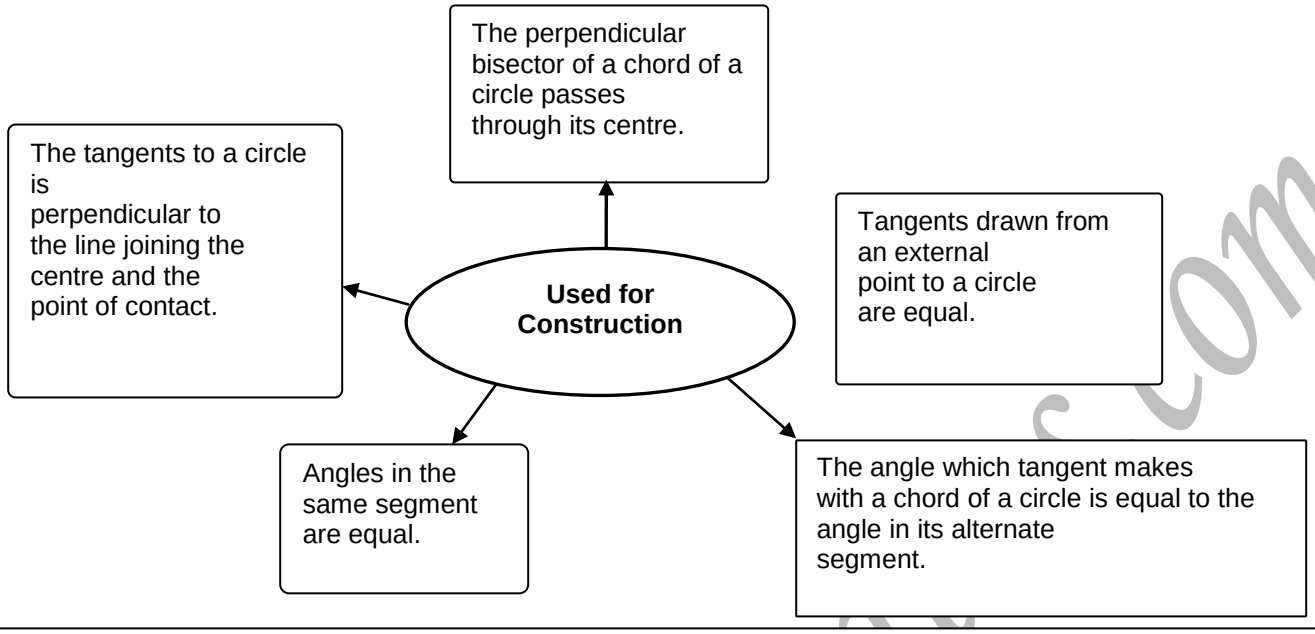
Occurrence of an Event : An event A associated to a random experiment is said to occur, if any one of the elementary events associated to the event A is an outcome.

Probability : If there are n elementary events associated with a random experiment and m of them are favourable to an event A then the probability of happening of event A is defined as the ratio $\frac{m}{n}$ and is denoted by P(A).

$$\therefore P(A) = \frac{m}{n}.$$

Probability of any event always lies between 0 and 1, i.e.,
(i) Probability of an event cannot be negative.
(ii) Probability of an event cannot be more than 1.

Constructions



Construction of a triangle similar to a given triangle.

Scale Factor : The ratio of the sides of the triangle to be constructed with the corresponding sides of the given triangle is known as their scale factor

● Suppose we are given a triangle ABC and we have to construct a triangle PQR similar to Δ ABC whose sides are $\frac{3}{4}$ of the corresponding sides of Δ ABC. Then, we say the scale factor is $\frac{3}{4}$.

How to Construct ?

Let ABC be the given triangle and we want to construct a triangle similar to Δ ABC such that each of its sides is $\left(\frac{m}{n}\right)^{th}$ of the corresponding sides of Δ ABC. We follow the following steps to construct the same.

Steps of constructions when m < n :

1. Construct the given triangle ABC by using the given data.
2. Take any one of the three sides of the given triangle as base. Let AB be the base of the given triangle.
3. At one end, say A, of base AB construct an acute angle $\angle BAX$ below the base AB.
4. Along AX mark off n points A_1, A_2, A_3, ……., A_n such that
   $AA_1 = A_1A_2 = \ldots\ldots = A_{n-1}A_n$.
5. Join A_nB.
6. Start from A and reach to point A_m on AX. Draw A_mB' parallel to A_nB which meets AB at B'.
   which meets AB at B'.
7. From B' draw B' C' || CB meeting AC at C'

Triangle AB'C' is the required triangle, each of whose sides is $\left(\frac{m}{n}\right)^{th}$ of the corresponding sides of Δ ABC.

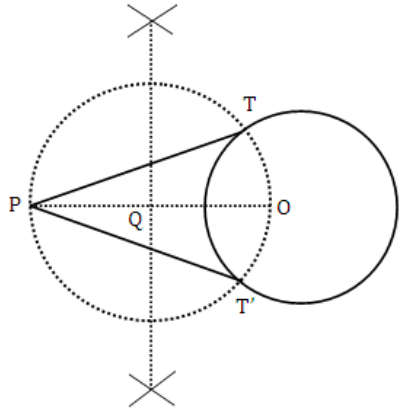
Construction of Tangents to a circle from an External point

Type – I :

CONSTRUCTION OF TANGENTS TO A CIRCLE FROM AN EXTERNAL POINT WHEN ITS CENTRE IS KNOWN

Steps of construction

1. Join the centre O of the circle to the given external point P i.e. Join OP.
2. Draw right bisector of OP, intersecting OP at Q.



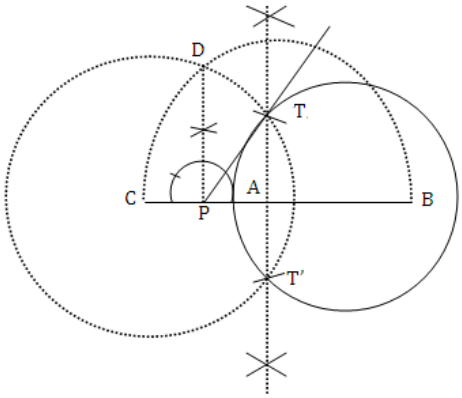
3. Taking Q as centre and OQ = PQ as radius, draw a circle to intersect the given circle at T and T'.
4. Join PT and PT' to get the required tangents as PT and PT'

Type – II :

CONSTRUCTION OF TANGENTS TO A CIRCLE FROM AN EXTERNAL POINT WHEN ITS CENTRE IS NOT KNOWN

Steps of construction

1. Let P be the external point from where the tangents are to be drawn to the given circle. Through P drawn a secant PAB to intersect the circle at A and B (say).



2. Produce AP to a point C such that AP = PC i.e., P is the mid-point of AC.
3. Draw a semi-circle with BC as diameter.
4. Draw PD $\perp$ CB, intersecting the semi-circle at D.
5. With P as centre and PD as radius drawn arcs to intersect the given circle at T and T'.
6. Joint PT and PT. Then PT and PT' are the required tangents.

Revision Question Bank

Subjective Type Questions

1. One card is drawn from a pack of 52 cards, each of the 52 cards being equally likely to be drawn. Find the probability that the card drawn is :

(i) an ace (ii) red (iii) either red or king
(iv) red and a king (v) a face card (vi) a red face card
(vii) '2' of spades (viii) '10' of a black suit

2. Find the probability of getting 53 Fridays in a leap year.

3. Harpreet tosses two different coins simultaneously (say, one is of Rs 1 and other of Rs 2). What is the probability that she gets at least one head ?

4. Three unbiased coins are tossed together. Find the probability of getting:

(i) all heads (ii) two heads
(iii) one head (iv) at least two heads

5. Construct a triangle similar to a given triangle ABC with its sides equal to $\frac{3}{4}$ of the corresponding sides of the triangle ABC $\left(\text{i.e., of scale factor } \frac{3}{4}\right)$.

6. In a survey, it was found that 30% of the population is using non-biodegradable products while the remaining is using biodegradable products. What is the probability that a person chosen at random uses non-biodegradable products ?

(i) Which type of products should be used in a society for its proper development-biodegradable or non-biodegradable ? Justify your answer.

7. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60^0.

8. Let ABC be a right triangle in which AB = 6 cm, BC = 8 cm and $\angle B = 90^0$. BD is the perpendicular from B to AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle.

9. Apporv throws two dice once and computes the product of the numbers appearing on the dice. Peehu throws one die and squares the number that appears on it. Who has the better chance of getting the number 36? Why ?

10. If you toss a coin 6 times and it comes down heads on each occasion. Can you say that the probability of getting a head is 1? Give reasons.

Answers

1(i) 1/3 **(ii)** 1/2 **(iii)** 7/13 **(iv)** 1/26 **(v)** 3/13 **(vi)** 3.26 **(vii)** 1/52
(viii) 1.26 **2.** 2/7 3. 3/4 **4. (i)** 1/8 **(ii)** 3/8 **(iii)** 3/8 **(iv)** 1/2
6. 7/10 **(i)** Biodegradable products are reusable & cause less pollution so such products should be used. **9.** Peehu; probability of Apoorv's getting $36 = \frac{1}{36}$ while probability of Peehu's getting $36 = \frac{1}{6}$ **10. (i)** No, the outcomes 'odd number', 'even number' are equality likely in the situation considered.
(ii) No, the outcomes 'Head' & 'tail' are equally likely every time regardless of what you get in few tosses.

Previous Years Question Bank

1. Construct a triangle ABC with side BC = 7cm, $\angle B = 45^0$, $\angle A = 105^0$. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of the ΔABC. **[CBSE Board, 2016-17]**

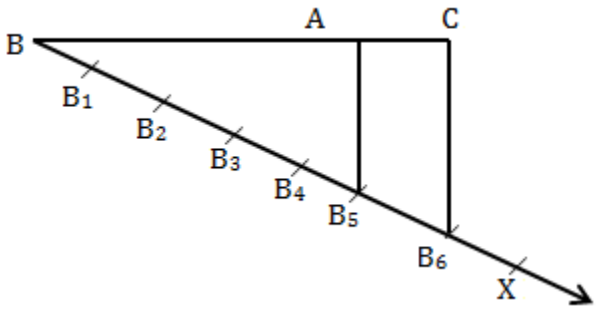
2. Draw a right triangle in which sides (other than hypotenuse) are of lengths 8cm and 6cm. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of the first triangle.

(Steps of construction not required) **[CBSE Board, 2016-17]**

3. Construct a tangent to a circle of radius 5cm from a point on the concentric circle of radius 6cm and measure its length. **[CBSE Board, 2016-17]**

4. P is a point on the circle of radius 3.5cm. Construct a tangent to the circle at P. **[CBSE Board, 2016-17]**

5. In the figure, B_1, B_2, B_3, ... are points on ray BX at equal distances and $B_5 A \parallel B_6 C$. Find the ratio in which A divides BC. **[CBSE Board, 2016-17]**



6. Divide a line segment AB of length 9.2cm in the ratio 1:3 by bisecting it twice. Find the measures of the two parts. **[CBSE Board, 2016-17]**

7. Construct $\Delta DEF \sim \Delta ABC$ in which AB = 5.2cm $\angle B = 45^0$ and BC = 6cm, using scale factor 1:2.

[CBSE Board, 2016-17]

8. A die is thrown once. Find the probability of getting an odd prime number which is less than 3.

9. Draw a line segment AB = 7.5cm. Find point P such that AP : BP = 3:2. **[CBSE Board, 2016-17]**

10. Draw an equilateral triangle of side 4cm and then another triangle whose sides are $\frac{5}{4}$ of the corresponding sides of the first triangle. **[CBSE Board, 2016-17]**

11. Draw a line segment of length 6.5 cm. Find a point P on it which divides it in the ratio 3:2.

[CBSE Board, 2016-17]

12. Draw a right triangle ABC in which AC = 9cm, BC = 6cm and $\angle B = 90^0$. Construct another triangle whose sides are $\frac{3}{2}$ times the corresponding sides of ΔABC. **[CBSE Board, 2016-17]**

13. The probability of selecting a rotten apple randomly from a heap of 900 apples is 0.18. What is the number of rotten apples in the heap? **[CBSE Board, 2016-17]**

14. A bag contains 15 while and some black balls. If the probability of drawing a black ball from the bag is thrice that of drawing a white ball, find the number of black balls in the bag. **[CBSE Board, 2016-17]**

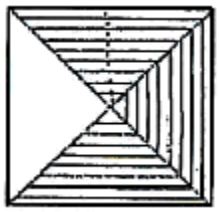
15. A die is thrown once. Find the probability of getting a number that is neither prime nor composite. **[CBSE Board, 2016-17]**

16. Seeta and Geeta are two sisters with an age difference of 3 years. Find the probability that:

(a) both are born in a leap year

(b) at least one of them is born in a leap year. **[CBSE Board, 2016-17]**

17. A dart is thrown at a square divided into four equal triangles as shown in the given figure. If the dart must hit the square and all points are hit with equal probability then find probability that the **[CBSE Board, 2016-17]**



(i) dart will land on the shaded region (ii) dart will not land in the shaded region

18. A child has a block in the shape of a cube with one letter/number written on each face as shown below: **[CBSE Board, 2016-17]**

1	A	A	B	C	D

The cube is thrown once. Find the probability of getting

(A) B or C (B) a number

(C) a vowel (D) a consonant

19. A die is thrown once. Find the probability of getting a non-negative integer. **[CBSE Board, 2016-17]**

20. Rajan had a bag with 30 marbles: 12 blue, 7 red, 5 white and the rest were gray. **[CBSE Board, 2016-17]**

(a) He took a marble. What is the probability that it is a blue marble?

(b) If he puts the marble back and takes another one, what is the probability of taking a red one?

(c) Rajan took a grey marble and didn't put it back. What is the probability of taking another grey marble immediately after that?

21. Draw a circle of radius 4 cm. From a point 8 cm away from its centre, construct the pair of tangents to the circle and measure their lengths. (Steps of construction not required) **[CBSE Board, 2016,17]**

22. Construct a triangle of sides 4 cm, 5 cm and 6 cm and then a triangle similar to it whose sides are $\frac{2}{3}$ of the corresponding sides of the first triangle. (Also, write steps of construction) **[CBSE Board, 2015-16]**

23. Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of 60^0. **[CBSE Board, 2016,17]**

24. What is the probability of a sure event? **[CBSE Board, 2015-16]**

25. Cards marks with number 1 to 100 are placed in a box. One card is drawn. Find the probability that the card drawn shows: **[CBSE Board, 2015-16]**

(i) an even number (ii) a number less than 14

(iii) a number which is a perfect square (iv) a prime number less than 20

26. Find the probability of getting a head when a coin is tossed once. **[CBSE Board, 2015-16]**

27. A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be

(i) Red? (ii) White? (iii) Not green? **[CBSE Board, 2015-16]**

28. Two different dice are tossed together. Find the probability that the product of the two numbers on the top of the dice is 6. **[CBSE Board, 2014-15]**

29. A bag contains, white, black and red balls only. A ball is drawn at random from the bag. If the probability of getting a white ball is 3/10 and that of a black ball is 2/5, then find the probability of getting a red ball. If the bag contains 20 black balls, then find the total number of balls in the bag. **[CBSE Board, 2015, 17]**

30. A card is drawn at random from a well-shuffled deck of playing cards. Find the probability that the card drawn is

(i) a card of spade or an ace. (ii) a black king,

(iii) neither a jack nor a king, (iv) either a king or a queen. **[CBSE Board, 2015,17]**

31. Construct a triangle ABC in which AB = 5 cm, BC = 6 cm and $\angle ABC = 60°$. Now construct another triangle whose sides are 5/7 times the corresponding sides of Δ ABC. **[CBSE Board, 2015,17]**

32. A card is drawn from a pack of cards number 1 to 52 find. The probability that the number on the card is a perfect square. **[CBSE Board, 2014-15]**

33. Construct a tangent to a circle of radius 5cm, from a point which is at a distance of 8cm from its centre. **[CBSE Board, 2014-15]**

34. A number 'x' is chosen from the numbers - 3, - 2, -1,0,1,2. Find the probability that $x^2 \leq 4$. **[CBSE Board, 2014-15]**

35. In a garden, 40% of the flowers are roses and rests are carnations. If $\frac{1}{4}$ of the roses and 1/10 of carnations are red, find the probability that flower selected at random is a **[CBSE Board, 2014-15]**

(a) rose (b) carnation (c) red rose (d) red carnation

36. 19 cards numbered 1, *2,* 3.....19 are put in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that the card is **[CBSE Board, 2015,17]**

(i) an even number (ii) a prime number (iii) a number divisible by 3

37. One card is drawn from a well shuffled deck of 52 cards. What is the probability of getting a red face card? **[CBSE Board, 2014-15]**

38. Two dice are thrown simultaneously. What is the probability that the sum of the numbers appearing on the dice is

(i) 7 (ii) not a prime number (iii) 1 **[CBSE Board, 2014-15]**

39. Draw a circle of radius 6 cm. From a point 10 cm away from its center construct the pair of tangents to the circle and measure their lengths. (Give the steps of construction). **[CBSE Board, 2014-15]**

40. (i) From a bag of 6 red and 5 blue balls, a ball is drawn at random. What is the probability of drawing a red ball.

(ii) A dice is thrown, find the probability of getting an odd prime number. **[CBSE Board, 2015,17]**

41. In a family of 3 children, the probability of having at least one boy is? **[CBSE Board, 2013-14]**

42. Find the probability that a number selected at random from the numbers 1, 2, 3, … , 15 is a multiple of 4. **[CBSE Board, 2013-14]**

43. Two different dice are tossed together. Find the probability **[CBSE Board, 2014, 17]**

(i) that the number on each die is even.

(ii) that the sum of numbers appearing on the two dice is 5.

44. Construct a triangle with sides 5 cm, 5.5 cm and 6.5 cm. Now construct another triangle, whose sides are $\frac{3}{5}$ times the corresponding sides of the given triangle. **[CBSE Board, 2014,17]**

45. Red queens and black jacks are removed from a pack of 52 playing cards. A card is drawn at random from the remaining cards, after reshuffling them. Find the probability that the drawn card is

(i) a king (ii) of red colour **[CBSE Board, 2014,17]**

(iii) a face card (iv) a queen

46. A card is drawn at random from a well shuffled pack of 52 cards. What is the probability of getting:

(i) a red card **[CBSE Board, 2011-12]**

(ii) a face card ?

Chapter Test

Maximum Marks: 30 **Maximum Time: 1 hour**

1. One card is drawn from a well-shuffled deck of 52 cards. What is the probability of getting a red face card? **[1]**

2. A die is thrown once. What is the probability of getting a prime number? **[1]**

3. Draw a circle of diameter 8 cm. From a point P, 7 cm away from its centre, construct a pair of tangents to the circle. Measure the lengths of the tangent segments. **[4]**

4. In a simultaneous toss of four coins, what is the probability of getting : **[4]**

(a) a less than 2 heads ? (b) exactly 2 heads ?

(c) more than 2 heads ? (d) No head

5. Draw any triangle ABC. Construct another triangle AB'C' similar to the triangle ABC with each side equal to $4/5^{th}$ of the corresponding side of triangle ABC. Write the steps of construction also. **[4]**

6. One card is drawn from a pack of 52 cards, each of the 52 cards being equally likely to be drawn. Find the probability that : **[4]**

(i) The card drawn is red (ii) The card drawn is red and queen

(iii) The card drawn is spade or a club (iv) The card drawn is Jack, queen, king or an ace

7. Miss Deepanshi earns Rs. 30,000 in month. She spends Rs. 25,000 in her needs. **[4]**

(i) What is the probability of her saving ?

(ii) Which mathematical concept will be used to solve the above problem?

8. A bag contains white, black and red balls only. A ball is drawn at random from the bag. If the probability of getting a white ball is 3/10 and that of a black ball is 2/5, then find the probability of getting a red ball. If the bag contains 20 black balls, then find the total number of balls in the bag. **[4]**

9. Let ABC be a right triangle in which AB= 6 cm, BC = 8 cm and $\angle B = 90^o$. BD is the perpendicular from B on AC. The circles through B,C,D is drawn. Construct the tangents from A to this circle. **[4]**

Answers

1. 3/26	**2.** 1/2	**4. (a)** 5/16	**(b)** 3/8	**(c)** 5/16	**(d)** 1/16
6. (i) 1/2	**(ii)** 1/26	**(iii)** 1/2	**(iv)** 4/13	**(v)** 1/52	
7. (i) 1/6	**(ii)** probability	**8.** 3/10, 50			

Topic: **Heredity and Evolution**

Chapter Flowchart

The Chapter Flowcharts give you the gist of the chapter flow in a single glance.

Heredity

Transmission of characters (or traits) from the parents to their offsprings.

Variations

- Differences in the characters (or traits) among the individuals of a species.
- It helps in adaptation of organisms to the changing environment.
- It also forms the basis of heredity.
- It constitutes the raw material for organic evolution and development of new species.

Inherited Traits

Traits and characteristics are reliably inherited to next generation to provide a common basic body design.

Rules for Inheritance of Traits

- Gregor Johann Mendel first studied inheritance of characters.
- He did his study on pea plant.

Monohybrid Cross

- Mendel crossed pea plants with one pair of contrasting traits to get F_1 generation.
- The F_1 plants were allowed to self-pollinate.
- He concluded:
  –Characters were controlled by factors or genes which occur in pairs (alleles).

Dihybrid Cross

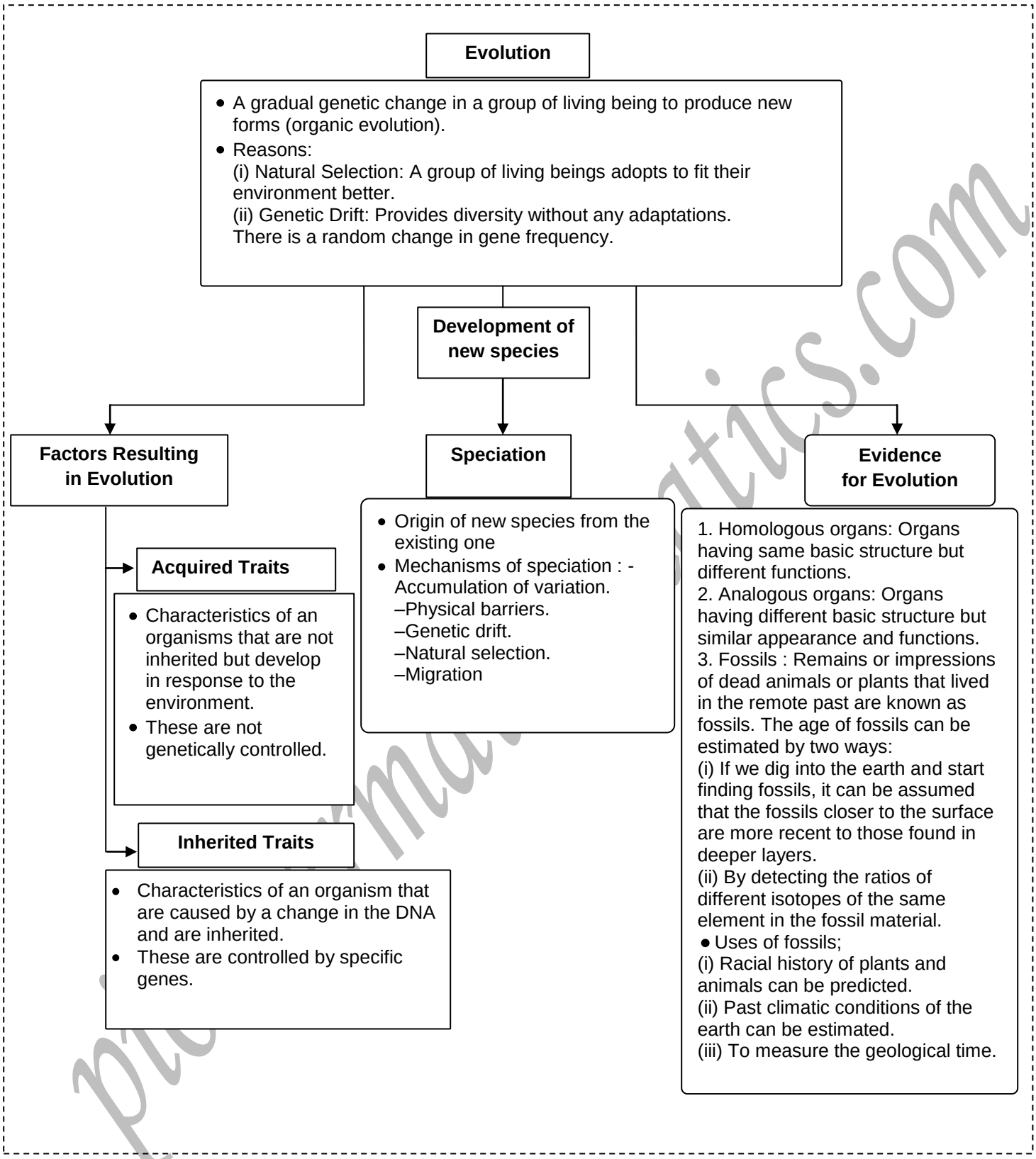
- Mendel crossed pea plants considering two pairs of contrasting characters at a time to get F_1 generation.
- The F_1 plants were allowed to self-pollinate.
- He conclude:
  – Pairs of contrasting characters behave independently of the other pairs.
  – At the time of gamete formation all genes assort independently of each other.

How are Traits Expressed

- Cellular DNA is the information source for making proteins in the cell.
- A section of DNA that provides information for one protein is called the gene for that protein.
- Each gene set is present as separate independent pieces called chromosomes.
- Each cell has two copies of each chromosome, one each from male and female parents.
- Every germ cell takes one pair from each pair.
- When two germ cells combine, the normal number of chromosomes is restored.

Sex Determination

- Process by which the sex of a person is determined.
- The female has two X-chromosomes (XX) in the germ cell or egg and the male has one X-chromosome and one Y-chromosome (XY) in the germ cell or sperm.
- When a sperm bearing X-chromosome unites with egg or ovum, female (XX) child is born.
- When a sperm bearing Y-chromosome unites with ovum, male (XY) child is born.



Revision Question Bank

1. Why are acquired characters not inheritable?
2. How does the creation of variations in a species promote survival?
3. What is genetic drift?
4. Explain how sexual reproduction gives rise to more viable variations than asexual reproduction. How does this affect the evolution of those organisms that reproduce sexually?
5. How is the sex of the child determined in human beings?
6. In the following crosses write the characteristics of the progeny.

Cross	Progeny
(a) RR YY X RR YY	_____
Round, yellow and round, yellow	
(b) Rr Yy X Rr Yy	_____
Round, yellow and round, yellow	
(c) rr yy X rr yy	_____
Wrinkled, green and wrinkled, green	
(d) RR YY X rr yy	_____
Round, yellow and wrinkled, green	

7. Why do all the gametes formed in human females have X chromosome?
8. Explain analogous organs and homologous organs. Identify the analogous and homologous organs amongst the following :
   Wings of an insect, wings of a bat, forelimbs of frog, forelimbs of a human.
9. What are fossils? What do they tell us about the process of evolution?
10. A man with blood group A marries a woman with blood group O and their daughter has blood group O. Is this information enough to tell you which of the traits—blood group A or O—is dominant? Why or why not?

Answers

6. (a) RRYY (Round, yellow) **(b)** 9 (Round, yellow): 3(Round, Green):3(Wrinkle, yellow): 1 (Wrinkle, Green): **(c)** All rryy (Wrinkle, yellow) **(d)** all RrYy (Round, yellow)

MCQ's [Practical Based Questions]

EXPERIMENT: "study the comparative cleansing Capacity of soap"

1. On applying soap to a wet cloth/ Leena observed that scums are formed. These scums are :
(a) Calcium salt of higher carboxylic acid.
(b) Magnesium salt of higher carboxylic acid.
(c) Sodium salt of higher carboxylic acid.
(d) Calcium or magnesium salt of higher carboxylic acid. **[CBSE Board 2013-14]**

2. The sample of water given to students contains calcium bicarbonate. For examining its cleaning action, it is to be considered as :
(a) hard water (b) temporary hard water
(c) soft water (d) permanent hard water **[CBSE Board 2013-14]**

3. If water has magnesium chloride dissolved in it, for examining its cleaning action, it is to be considered as :
(a) hard water (b) soft water
(c) temporary hard water (d) permanent hard water **[CBSE Board 2013-14]**

4. A student wants to produce lather using soap solution and hard water. He should use :
(a) dilute soap solution (b) fairly concentrated soap solution
(c) excess of soap solution (d) very little soap solution **[CBSE Board 2013-14]**

5. Teacher advised her students to take a soap for testing its cleansing action in hard and soft water because soaps are **[CBSE Board 2013-14]**
(a) biodegradable (b) non-biodegradable (c) persistent (d) synthetic.

6. Soap micelles formed as a result of dissolving soap in soft water are :
(a) clusters of soap molecules arranged randomly.
(b) clusters of soap molecules arranged in a straight chain.
(c) clusters of soap molecules arranged radially.
(d) none of the above. **[CBSE Board 2013-14]**

7. Washing soda is the ingredient in soap which is used to make soap effective in : **[CBSE Board 2013-14]**
(a) hard water (b) hot water (c) cold water (d) soft water

8. A student was given two samples of water A and B. He added soap solution to both the samples and observed a scum in sample B and no scum in sample A. He concluded that:
(a) Sample A is of hard water. (b) Sample B is of hard water.
(c) Both A and B are samples of soft water.
(d) Sample A is of soft water and sample B is of hard water. **[CBSE Board 2013-14]**

9. When soap is applied on to a cloth made wet with soft water, the long chain hydrocarbon of carboxylic acid in a soap molecule which helps in removal of dirt is :
(a) hydrophilic in nature (b) hydrophobic in nature
(c) neutral in nature (d) both (a) and (b) **[CBSE Board 2013-14]**

10. A teacher advised her students not to take detergents for testing its cleansing action in hard and soft water because detergents are **[CBSE Board 2013-14]**
(a) biodegradable (b) non-biodegradable (c) persistent (d) natural

Answers

1	d	**2**	b	**3**	d	**4**	c	**5**	a
6	a	**7**	a	**8**	d	**9**	b	**10**	b

Previous Years Question Bank

1. Give an appropriate term for the trait that an organism has due to inheritance. **[CBSE Board, 2016-17]**

2. How is the sex of a newborn individual determined in humans? How are the sex chromosomes in human male and female represented? **[CBSE Board, 2016-17]**

3. Farmers generated different vegetables from wild cabbage by artificial selection.
Name the vegetable obtained for the following desired traits. **[CBSE Board, 2016-17]**
(i) Arrested flower development (ii) Sterile flowers
(iii) Very short distances between leaves (iv) Swollen parts (v) Broader leaves

4. (a) Who gave the laws of inheritance? **[CBSE Board, 2016-17]**
(b) State the two laws of inheritance.

5. When a round seeded pea plant is crossed with a wrinkled seeded pea plant, what type of plant we get in F_1 generation? **[CBSE Board, 2016-17]**

6. Explain with the help of a how chart father is responsible for the sex of a child. **[CBSE Board, 2016-17]**

7. Define evolution. How are traits inherited? Why are traits acquired during the lifetime of an individual not passed on to the next generation? **[CBSE Board, 2016-17]**

8. All dead organisms do not leave their fossil records, but in some cases their fossils are formed. How do these fossil records form a direct evidence of past happenings? **[CBSE Board, 2016-17]**

9. Describe in brief the independent inheritance of two separate traits like shape and colour of seeds of a pea plant. **[CBSE Board, 2016-17]**

10. (a) Define the following terms **[CBSE Board, 2016-17]**
(i) Dihybrid cross (ii) Phenotype
(b) In a pea plant the character of tallness (T) dominates over the dwarfness (t) Predict the genotype and phenotype for F_1 generation when the both parent plants are Tt. That is heterozygous for the given character. Draw punnet square also.

11. On the notice board of ultrasound clinics it is generally stated" Here prenatal sex determination of the foetus is not done. It is prohibited and punishable under law? **[CBSE Board, 2016-17]**
(a) Mention two advantages of imposing ban or prenatal sex determination

12. (a) What is meant by a trait of a species? Distinguish between acquired and inherited traits (2 points)
(b) Why are thorns of Bougainvillea plant and tendrils of Passiflora plant considered homologous?
(c) Define Genetic-drift. **[CBSE Board, 2014 ,17]**

13. With regards to turnip carrot sweet potato and potato. The first three belong to the same category. Identify whether these three are homologous or analogous organs. Also mention the reason why the fourth one does not belong to the same category. **[CBSE Board, 2016-17]**

14. How can the chromosomes be identified? **[CBSE Board, 2016-17]**

15. In an organism the chromosome number is 26. This chromosome number is restored in the zygote. How does this occur? **[CBSE Board, 2016-17]**

16. A person has brown eyes, fair skin tone, plays basketball although is flat footed and is learning German. Which of these traits are genetically inherited? Justify your answer. **[CBSE Board, 2016-17]**

17. (a) From the following organisms, whose DNA do you think is similar to that of humans. Frog, Sparrow, Lizard, Gorilla **[CBSE Board, 2016-17]**

(b) Name the two processes by which different genotypes can be produced.

18. (a) DNA changes accumulated over a time span has resulted in evolution of complex organs. Discuss with the help of an example of origin of eye. **[CBSE Board, 2016-17]**

(b) Do all variations in a particular species have equal chances of survival in an environment?

19. How is the sex of the child is determined in human beings? Explain with diagram. **[CBSE Board, 2016-17]**

20. Differentiate between inherited and acquired traits with the help of example. **[CBSE Board, 2016-17]**

21. What are fossils? How are they formed? Describe in brief two methods of determining the age of fossils. State any one role of fossils in the study of the process of evolution. **[CBSE Board, 2016, 17]**

22. (a) When a sperm bearing Y chromosome fertilizes with egg, then why the child born will not be like his father? **[CBSE Board, 2016-17]**

(b) What will be the % of ab gametes produced by Aa and Bb?

23. A group of mice were bred and for some generations the tails of these mice were removed by surgery. Do these tailless mice will have tailless progeny? Why? What do we call these traits? **[CBSE Board, 2016-17]**

24. What is meant by the 'Evolution'? Mention various tools used to study the human evolutionary relationship. **[CBSE Board, 2016-17]**

25. Which trait will be observed by the offspring when it receives two copies of traits? **[CBSE Board, 2016-17]**

26. (a) What would happen if two groups of organisms of a single species never exchange genes?

(b) In which way can the study of diverse forms of life be done effectively? **[CBSE Board, 2016-17]**

27. "Fossils are related to evolution". **[CBSE Board, 2016-17]**

(a) Justify the statement.

(b) How can the relationship between man and chimpanzee be done.

28. State the ratio of plants produced in the monohybrid cross and dihybrid cross in the F_2 generation. **[CBSE Board, 2016-17]**

29. Identify the picture of the fossil given below: **[CBSE Board, 2016-17]**

(c) How can we say that birds are closely related to reptiles and have evolved from them?

30. (a) Give reasons why certain traits such as change in body weight, piercing of ears cannot be passed on the next generation. What are these traits called? **[CBSE Board, 2016-17]**

(b) If YYRR represent yellow and round seeds, what do the following represent?

(i) YYrr (ii) yyRR

(c) Write the sex of the baby that inherits X-chromosome from his father.

31. In one of his experiments with pea plants Mendel observed that when a pure tall pea plant is crossed with a pure dwarf pea plant, in the first generation, F_1 only tall plants appear. **[CBSE Board, 2016-17]**

(a) What happens to the traits of the dwarf plants in this case?

(b) When the F_1 generation plants were self-fertilised, he observed that in the plants of second generation, F_2 both tall plants and dwarf plants were present. Why it happened? Explain briefly.

32. What is meant by speciation? Explain briefly any four factors that can lead to speciation. Which of these cannot be a major factor in the speciation of a self-pollinating plant species? Give reasons to justify your answer. **[CBSE Board, 2016-17]**

33. Give reason for the following:- **[CBSE Board 2015-16]**

(a)Traits acquired during lifetime of an individual are not inherited. **[CBSE Board 2014-15]**

(b) All humans belong to a single species.

(c) Variations keep on accumulating during reproduction and do not disappear in next generation.

34. (a) 'Evolution has occurred in stages'. Justify the statement. **[CBSE Board 2015-16]**

(b) Differentiate between eye and eyespots. Which animal possesses eye spots?

35. (a) How many pairs of chromosomes are present in human beings? Out of these how many are sex chromosomes? How many types of sex chromosomes are found in human beings?

(b) "The sex of a new born child is a matter of chance and none of the parents may be considered responsible for it." Draw a flow chart showing determination of sex of new born to justify this statement. **[CBSE Board 2015-16]**

36. (a) Why do we say that homozygous plants produce pure progeny?

(b) Define heterozygous.

(c) Explain how the process of speciation takes place. **[CBSE Board 2015 ,16]**

37. Give differences: (a) Heredity and Variations (b) Dominant and Recessive Traits

(c) Natural and Artificial Selection. **[CBSE Board 2015-16]**

38. How do Mendel's experiments show that the (a) Traits may be dominant or recessive

(b) Traits are inherited independently. **[CBSE Board 2015, 16]**

39. What are chromosomes? Explain how in sexually reproducing organisms the number of chromosomes in the progeny is maintained. **[CBSE Board 2015-16]**

40. Explain the following : **[CBSE Board 2015-16]**

(a) Speciation (b) Natural Selection

41. Explain with an example for each, how the following provides evidences in favors of evolution in organisms : **[CBSE Board 2014-15]**

(a) Homologous organs (b) Analogous organs (c) Fossils

42.

[CBSE Board 2014,15]

(a) Which type of organs are shown in the figure above ?

(b) Which type of origin and structure do these organs have ?

43. It was observed that in a family a woman has only daughters. Analyse on the basis of genetics and give an explanation. **[CBSE Board 2014-15]**

44. Giving reasons state whether the following are Homologous or Analogous organs:

(i) Wing of a bat and wing of a bird (ii) Forelimbs of humans and bird **[CBSE Board 2014-15]**

45. 'Genetic composition of the father plays a deciding role in determining the gender of the newborn child'. Comment and support your answer with a suitable illustration. **[CBSE Board 2014-15]**

46. A normal baby girl receives her x chromosome from whom mother, father, both mother and father. **[CBSE Board 2014-15]**

47. What will happen if both the characters present in H generation pass together in F_2 generation?

48. Evolutionary relationship can be traced by study of homologous organs. Explain. **[CBSE Board 2014-15]**

49. Variation is useful for the survival of species over long time. But the variants have unequal chances of survival. Explain this statements **[CBSE Board 2014-15]**

50. What is a gene? **[CBSE Board, 2013-14]**

51. With the help of suitable examples, explain why certain traits cannot be passed on to the next generation. What are such traits called? **[CBSE Board, 2013-14]**

52. "A trait may be inherited, but may not be expressed." Justify this statement with the help of a suitable example. **[CBSE Board-2013-14]**

53. Write the full form of DNA? **[CBSE Board, 2013-14]**

54. In an area A, the leaf material available to beetles was very less. What are the two consequences seen in case of beetles? **[CBSE Board, 2013-14]**

55. What does analogy of organs indicate. Explain with example. **[CBSE Board, 2013-14]**

56. In organisms, some changes pertain to body cells and are not inherited whereas some changes pertain to germ cells and are inheritable. **[CBSE Board, 2013-14]**

(a) Name the two types of variations respectively.

(b) Explain the two ways by which individuals with a particular traits may increase in a population.

57. (a)Define heredity, What is the physical basis of heredity? **[CBSE Board, 2013-14]**

(b) What are the phenotypic and genotypic ratio in the F_2 generation in monohybrid cross?

(c) A body has parents with two different hair colours one with red hair and the other with black hair. The boy has black hair. If we consider the black colour dominating over the red colour, what could be the possible genotypes of the boy?

Chapter Test

Maximum Marks: 30 **Maximum Time: 1 hour**

1. Write down Mendel's dihybrid ratio for phenotypes and genotypes. **[1]**

2. How do studies on fossils provide evidences for evolution? **[2]**

3. What are heterozygous chromosomes and homozygous chromosomes with examples. **[3]**

4. What is variation? Name the basic processes that cause variation among organisms, how does it occur? What is its importance? **[4]**

5. Differentiate between natural selection and artificial selection. **[3]**

6. Answer the following questions. **[4]**

(a) Mono hybrid Cross and Dihybrid Cross

(b)Define 'Genotype' and phenotype.

(c)What is Dominant Gene ? With examples.

7. Work out the results upto F_2 generation, — from a cross between grey coloured dog having stumpy tail (GGSS) and a black coloured dog having normal tail (ggss). Point out the genetic principle involved in this cross. Give the genotypic & phenotypic ratio of F_1 generation and phenotypic ratio of F_2 generation. **[4]**

8. Justify the statement: The sex of the child depends upon its father. **[2]**

9. Give reasons why acquired characters are not inherited. **[2]**

10. Study the following cross and sowing self pollination in F_1, fill in the blank and answer the question that follows:

Parents	RRYY	x	rryy
Round, yellow	wrinkled, green		
F_1	– Rr Yy	x	?

Round, yellow

In above question, what are the combinations of character in the F_2 progeny? What are their ratios?

[5]

Answers

10. RrYy (Round, yellow) 9 (Round, yellow): 3(Round, Green):3(Wrinkle, yellow): 1 (Wrinkle, Green):